REMARKS

The specification and claims are amended to correct typographical errors. Applicants apologize for not submitting these corrections sooner. No new matter is submitted.

Entry of this amendment is respectfully requested.

Respectfully submitted,
FROMMER LAWRENCE & HAUG LLP

By: 
William S. Frommer
Reg. No. 25,506
(212) 588-0800

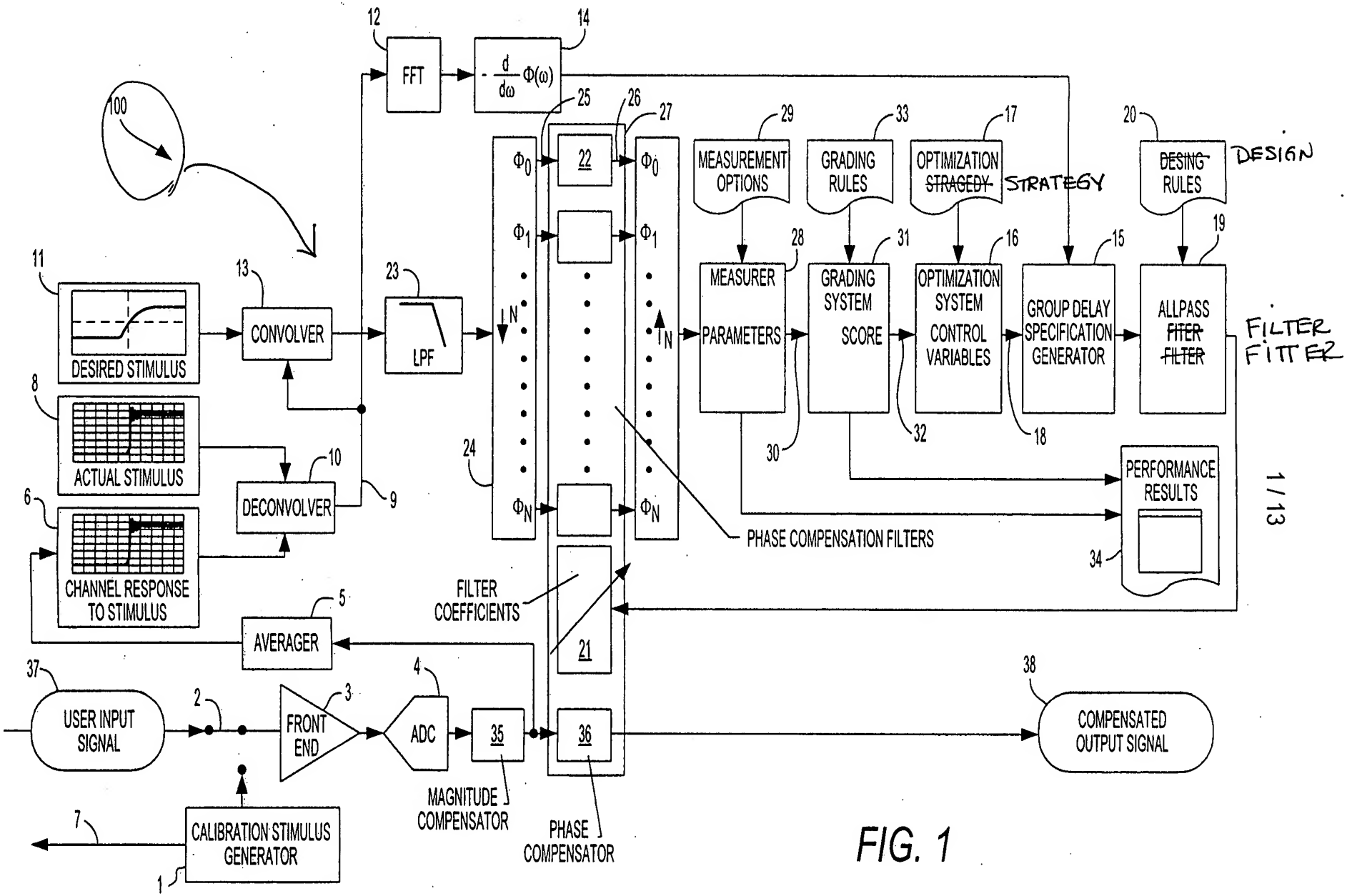

100
12
FFT
14
$-\frac{d}{d\omega}\Phi(\omega)$
25
26
27
22
Φ_0
Φ_1
Φ_N
N
29
MEASUREMENT OPTIONS
33
GRADING RULES
17
OPTIMIZATION STRATEGY
20
DESIGN RULES
DESIGN
11
DESIRED STIMULUS
13
CONVOLVER
23
LPF
28
MEASURER PARAMETERS
31
GRADING SYSTEM SCORE
16
OPTIMIZATION SYSTEM CONTROL VARIABLES
15
GROUP DELAY SPECIFICATION GENERATOR
19
ALLPASS FITER FILTER
FILTER FITTER
8
ACTUAL STIMULUS
10
DECONVOLVER
9
24
30
32
18
PERFORMANCE RESULTS
34
6
CHANNEL RESPONSE TO STIMULUS
PHASE COMPENSATION FILTERS
FILTER COEFFICIENTS
5
AVERAGER
21
37
USER INPUT SIGNAL
2
FRONT END
3
4
ADC
35
36
38
COMPENSATED OUTPUT SIGNAL
MAGNITUDE COMPENSATOR
PHASE COMPENSATOR
7
CALIBRATION STIMULUS GENERATOR
1

FIG. 1

1/13

FIG. 2

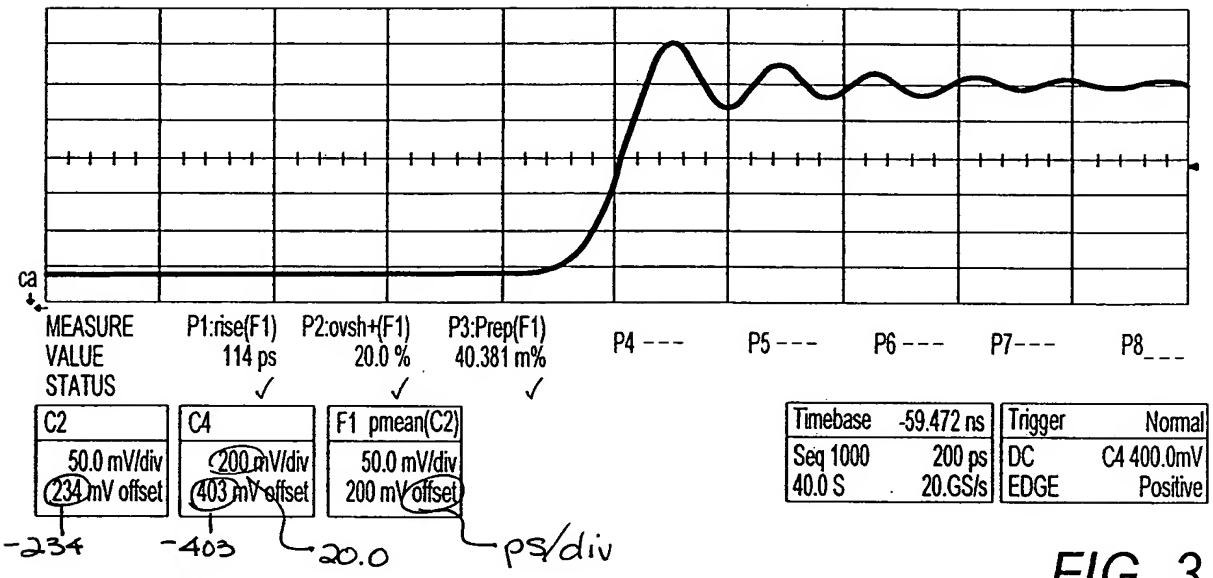


FIG. 3

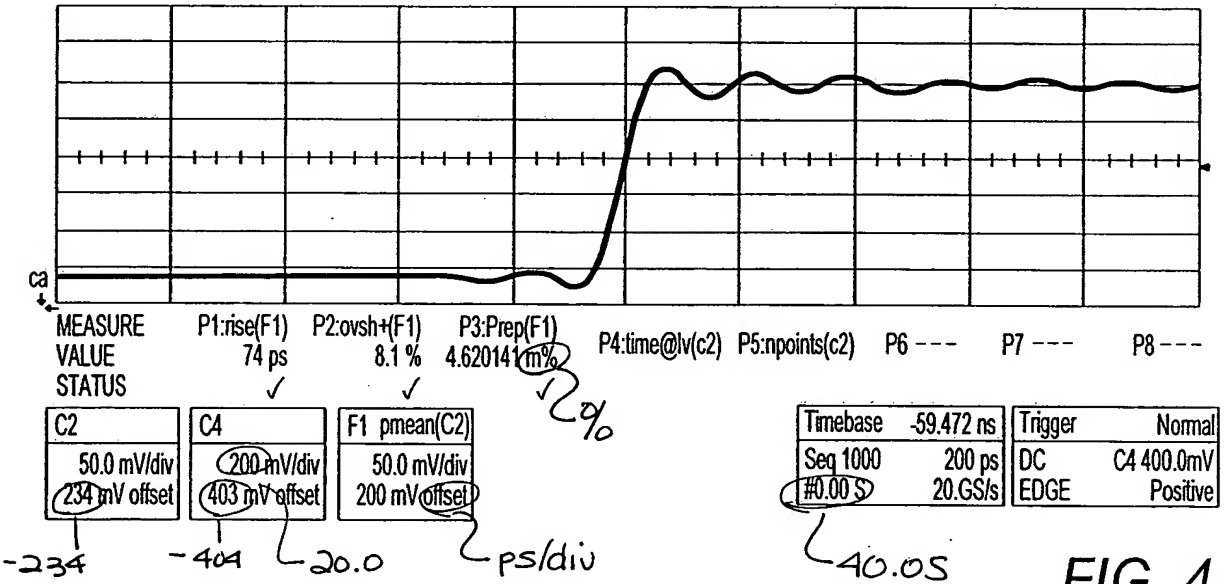


FIG. 4

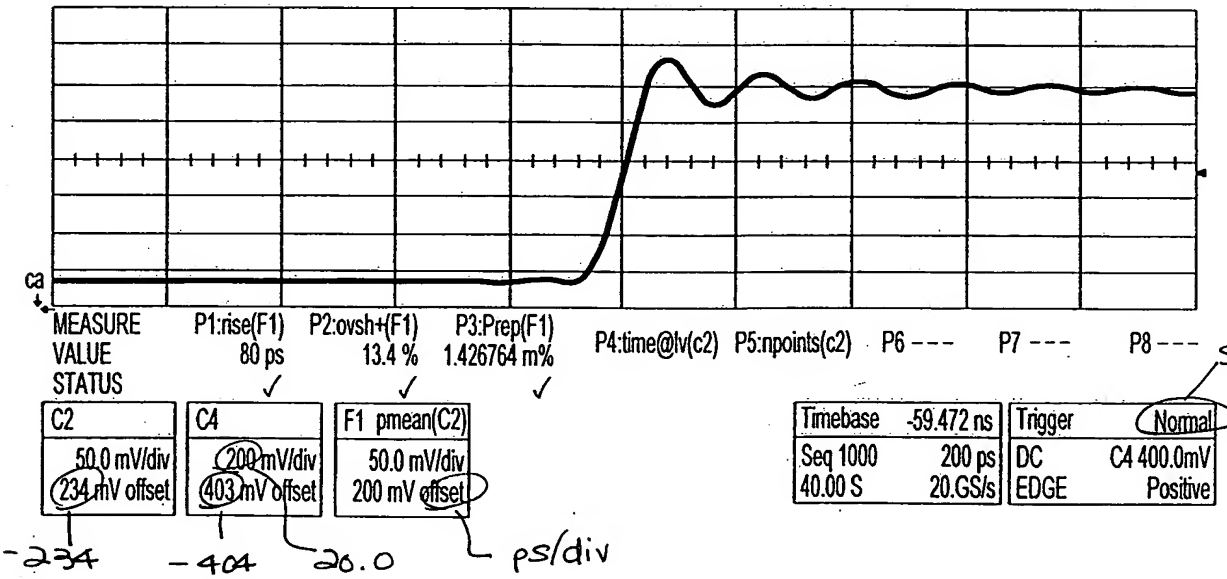
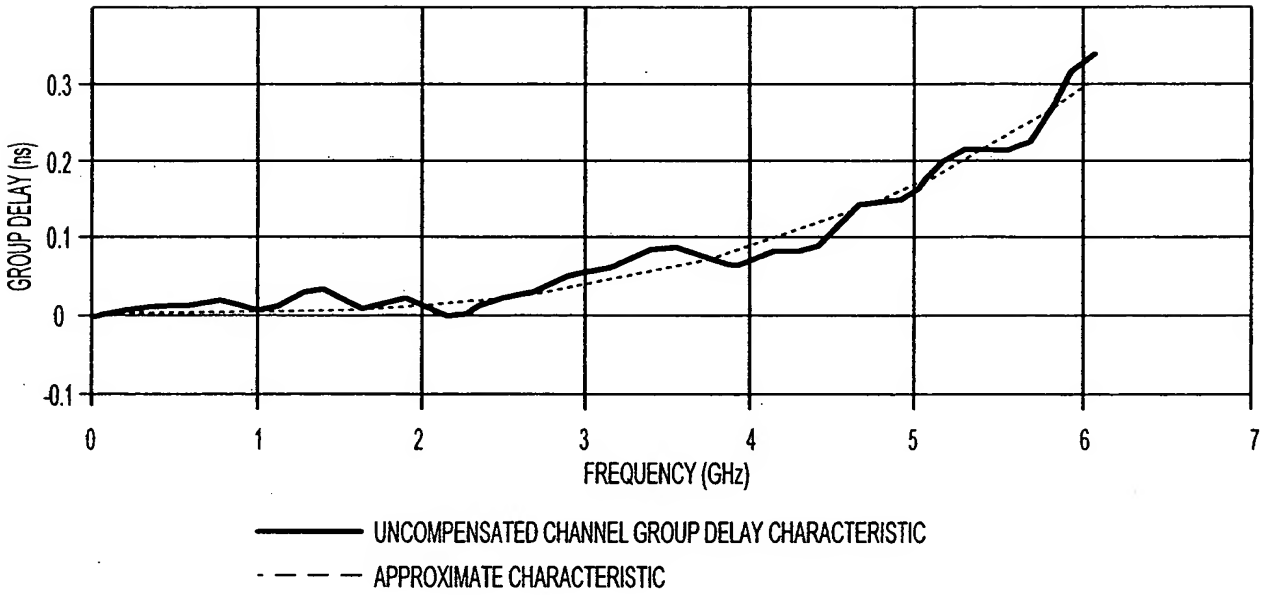


FIG. 5


GROUP DELAY (ns)
0.3
0.2
0.1
0
-0.1
0
1
2
3
4
5
6
7
FREQUENCY (GHz)
UNCOMPENSATED CHANNEL GROUP DELAY CHARACTERISTIC
APPROXIMATE CHARACTERISTIC

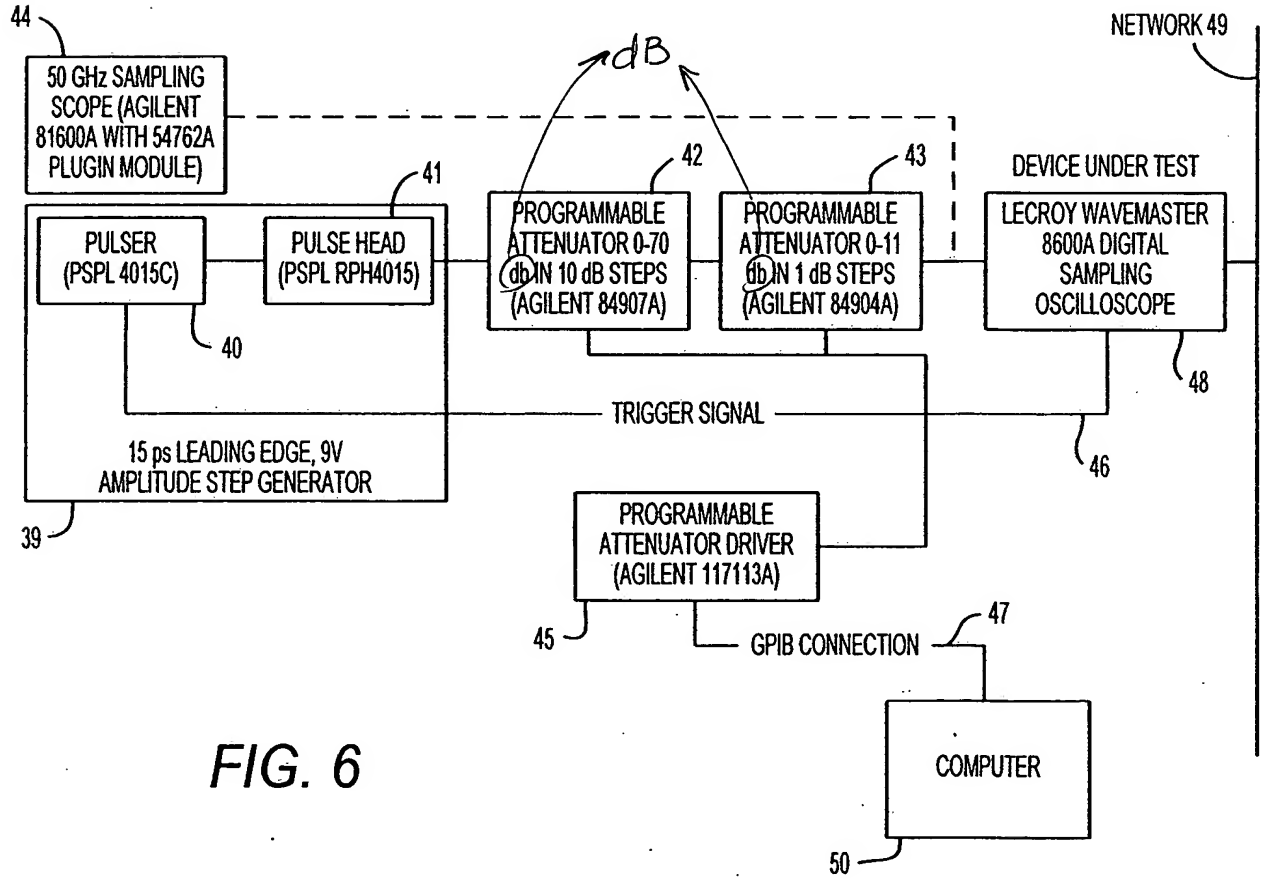

44
50 GHz SAMPLING SCOPE (AGILENT 81600A WITH 54762A PLUGIN MODULE)
NETWORK 49
dB
41
42
43
DEVICE UNDER TEST
PULSER (PSPL 4015C)
PULSE HEAD (PSPL RPH4015)
PROGRAMMABLE ATTENUATOR 0-70 db IN 10 dB STEPS (AGILENT 84907A)
PROGRAMMABLE ATTENUATOR 0-11 db IN 1 dB STEPS (AGILENT 84904A)
LECROY WAVEMASTER 8600A DIGITAL SAMPLING OSCILLOSCOPE
40
48
TRIGGER SIGNAL
46
15 ps LEADING EDGE, 9V AMPLITUDE STEP GENERATOR
39
PROGRAMMABLE ATTENUATOR DRIVER (AGILENT 117113A)
45
GPIB CONNECTION
47
COMPUTER
50

FIG. 6

FIG. 7

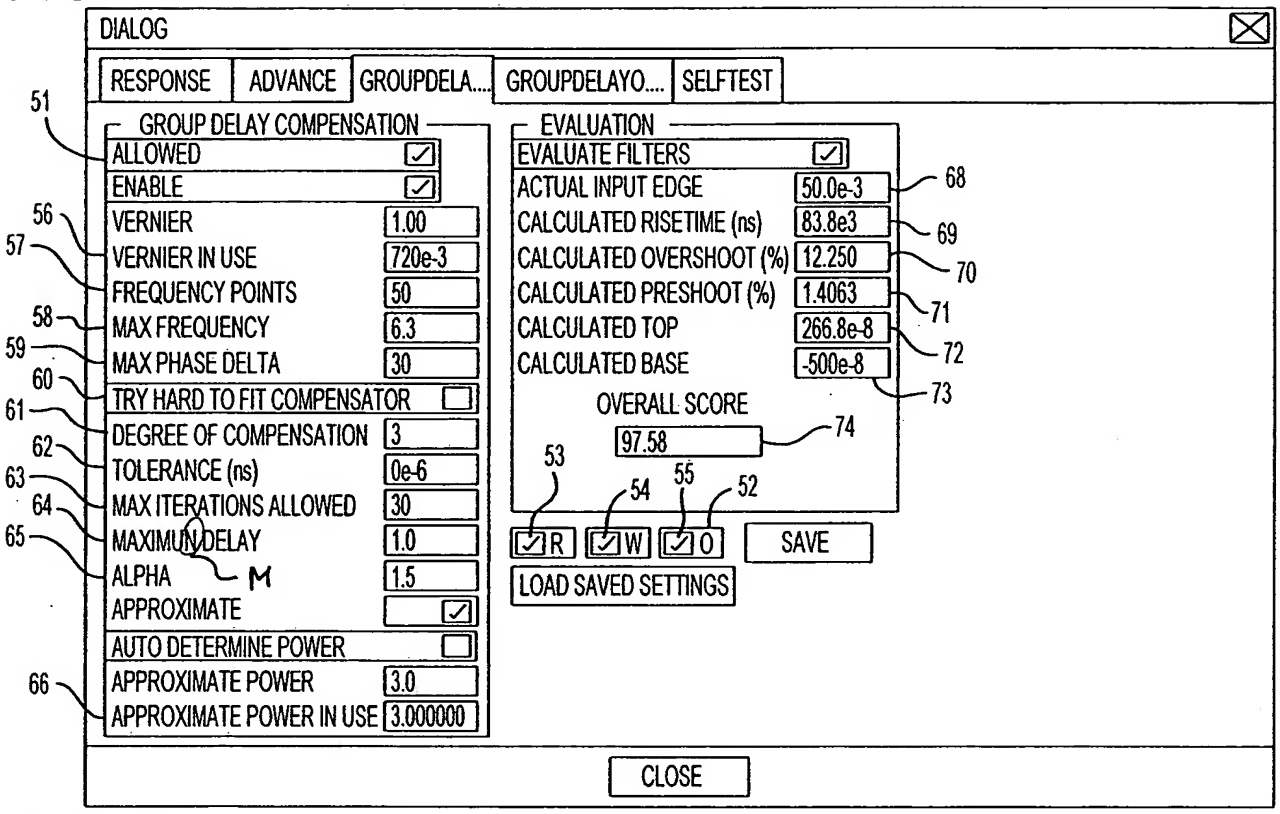
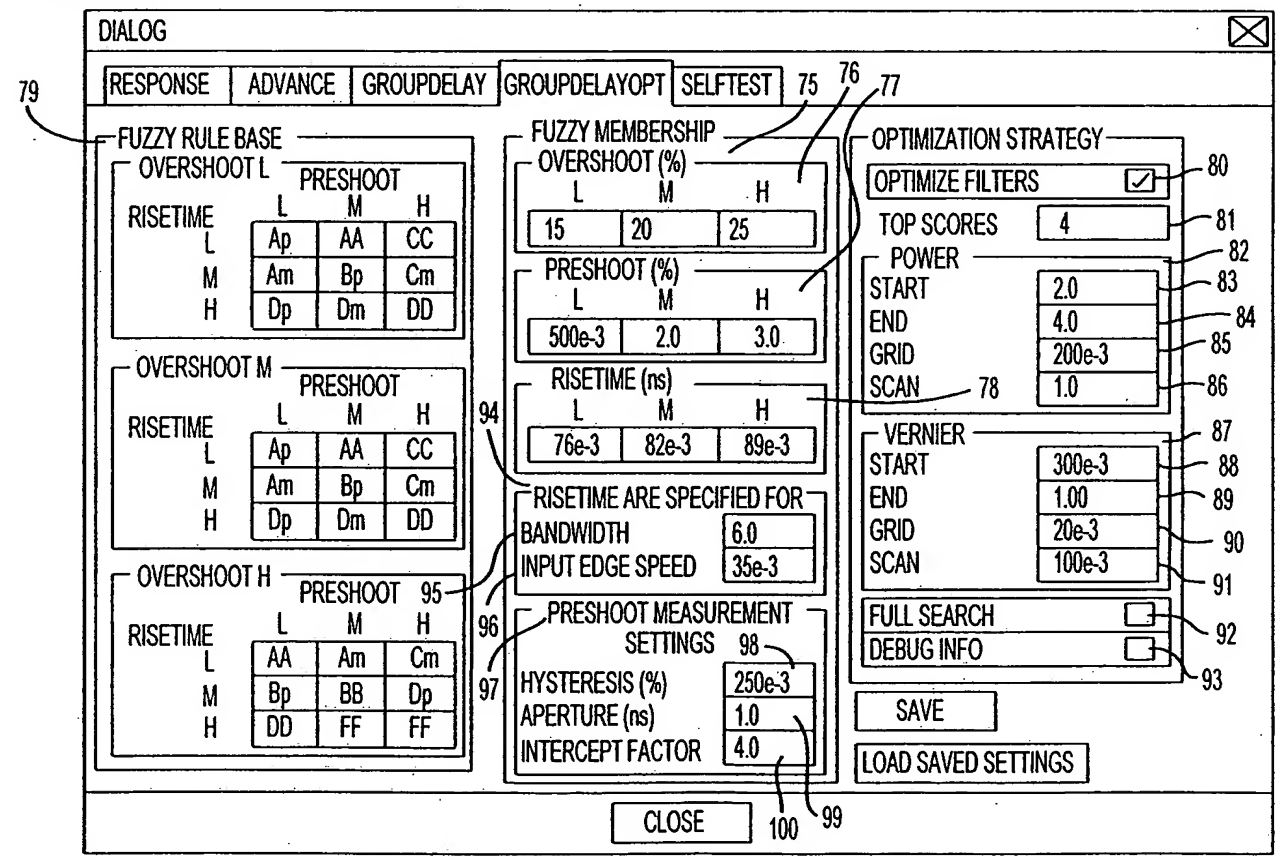

DIALOG
RESPONSE
ADVANCE
GROUPDELA....
GROUPDELAYO....
SELFTEST
GROUP DELAY COMPENSATION
ALLOWED
ENABLE
VERNIER 1.00
VERNIER IN USE 720e-3
FREQUENCY POINTS 50
MAX FREQUENCY 6.3
MAX PHASE DELTA 30
TRY HARD TO FIT COMPENSATOR
DEGREE OF COMPENSATION 3
TOLERANCE (ns) 0e-6
MAX ITERATIONS ALLOWED 30
MAXIMUM DELAY 1.0
ALPHA 1.5
APPROXIMATE
AUTO DETERMINE POWER
APPROXIMATE POWER 3.0
APPROXIMATE POWER IN USE 3.000000
EVALUATION
EVALUATE FILTERS
ACTUAL INPUT EDGE 50.0e-3
CALCULATED RISETIME (ns) 83.8e3
CALCULATED OVERSHOOT (%) 12.250
CALCULATED PRESHOOT (%) 1.4063
CALCULATED TOP 266.8e-8
CALCULATED BASE -500e-8
OVERALL SCORE
97.58
R
W
O
SAVE
LOAD SAVED SETTINGS
CLOSE
51
56
57
58
59
60
61
62
63
64
65
66
68
69
70
71
72
73
74
53
54
55
52

FIG. 8


DIALOG
RESPONSE
ADVANCE
GROUPDELAY
GROUPDELAYOPT
SELFTEST
FUZZY RULE BASE
OVERSHOOT L
PRESHOOT
RISETIME
L M H
L Ap AA CC
M Am Bp Cm
H Dp Dm DD
OVERSHOOT M
PRESHOOT
RISETIME
L M H
L Ap AA CC
M Am Bp Cm
H Dp Dm DD
OVERSHOOT H
PRESHOOT
RISETIME
L M H
L AA Am Cm
M Bp BB Dp
H DD FF FF
FUZZY MEMBERSHIP
OVERSHOOT (%)
L M H
15 20 25
PRESHOOT (%)
L M H
500e-3 2.0 3.0
RISETIME (ns)
L M H
76e-3 82e-3 89e-3
RISETIME ARE SPECIFIED FOR
BANDWIDTH 6.0
INPUT EDGE SPEED 35e-3
PRESHOOT MEASUREMENT SETTINGS
HYSTERESIS (%) 250e-3
APERTURE (ns) 1.0
INTERCEPT FACTOR 4.0
OPTIMIZATION STRATEGY
OPTIMIZE FILTERS
TOP SCORES 4
POWER
START 2.0
END 4.0
GRID 200e-3
SCAN 1.0
VERNIER
START 300e-3
END 1.00
GRID 20e-3
SCAN 100e-3
FULL SEARCH
DEBUG INFO
SAVE
LOAD SAVED SETTINGS
CLOSE
79
75
76
77
94
95
96
97
98
100
99
80
81
82
83
84
85
86
87
88
89
90
91
92
93
78

1	for n=0 ...N	FOR EACH RESPONSE POINT
2	$R_n = GD_{comprel}(f_n, g_{i-1}) + gd_{spec_n}$	CALCULATE A RESIDUAL
3	for j=0 ...2S-1	FOR EACH COEFFICIENT
4	$J_{n,j} = \frac{\sigma}{\sigma(g_{i-1})_j} GD_{comprel}(f_n, g_{i-1})$	CALCULATE AN ELEMENT OF THE JACOBIAN MATRIX
5	$H = J^T \cdot W \cdot J$	CALCULATE THE APROXIMATE HESSIAN MATRIX
6	for j=0 ...S2-1 — 2S - 1	GENERATE A MATRIX WHOSE DIAGONAL IS IDENTICAL TO THE HESSIAN MATRIX AND IS ZERO ELSWHERE
7	$D_{j,j} = H_{j,j}$	
8	$\Delta P = (H + \lambda \cdot D)^{-1} \cdot J^T \cdot W \cdot R$	CALCULATE THE CHANGE TO THE COEFFICIENT VALUES
9	$g_i = g_{i-1} - \Delta P$	APPLY THE CHANGE TO THE COEFFICIENTS
10	$mse_i = \frac{1}{N+1} \cdot \sum_n (gd_{spec_n} + GD_{comprel}(f_n, g_{i-1}))^2$	CALCULATE THE NEW MEAN SQUARED ERROR
11	true / $mse_i > mse_{i-1}$ / false	DID THE MEAN SQUARED ERROR INCREASE ?
12	$\lambda = \lambda \cdot 10$ FAVOR STEEPEST DECENT / $\lambda = \frac{\lambda}{10}$ FAVOR NETWONGAUSS CONVERGENCE	

FIG. 9

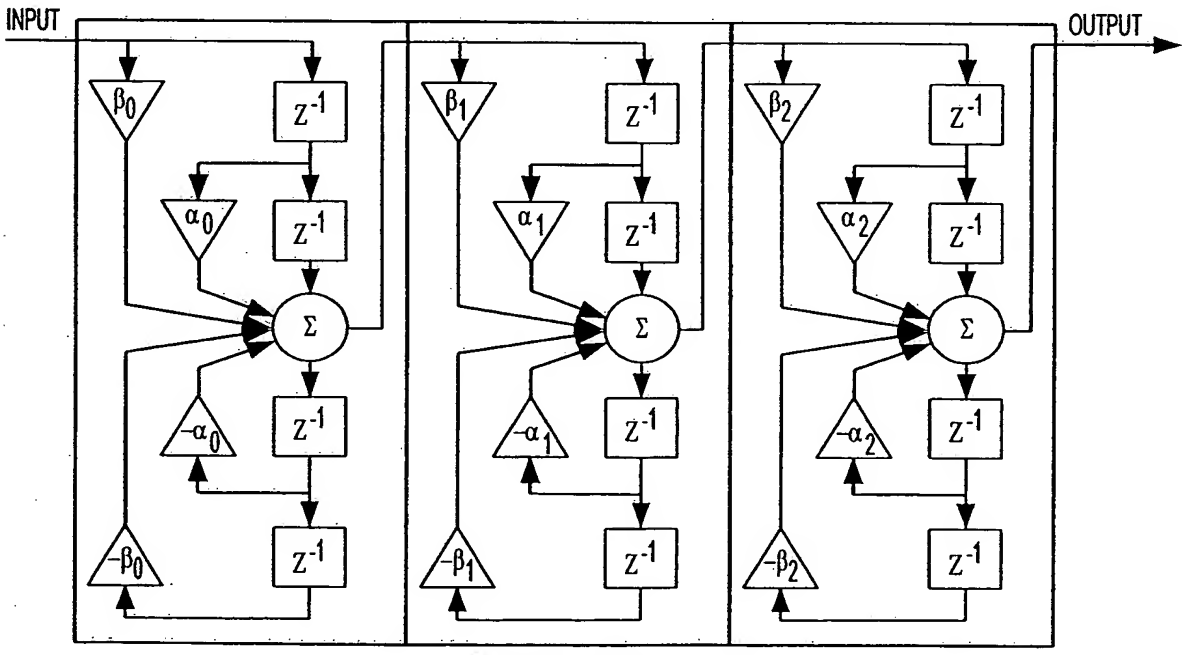


FIG. 10

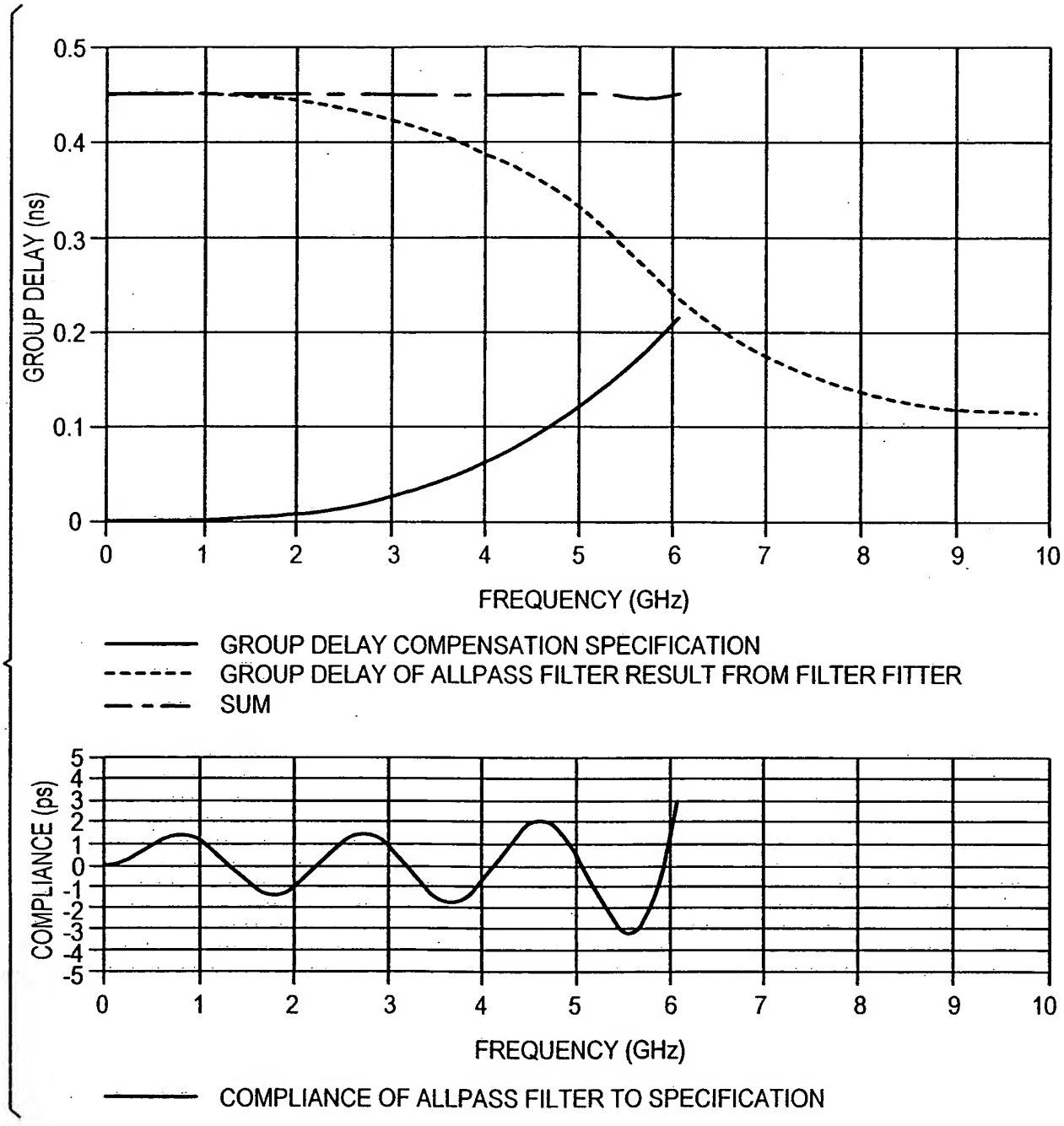

GROUP DELAY (ns)
0.5
0.4
0.3
0.2
0.1
0
0 1 2 3 4 5 6 7 8 9 10
FREQUENCY (GHz)
GROUP DELAY COMPENSATION SPECIFICATION
GROUP DELAY OF ALLPASS FILTER RESULT FROM FILTER FITTER
SUM
COMPLIANCE (ps)
5 4 3 2 1 0 -1 -2 -3 -4 -5
0 1 2 3 4 5 6 7 8 9 10
FREQUENCY (GHz)
COMPLIANCE OF ALLPASS FILTER TO SPECIFICATION

FIG. 11

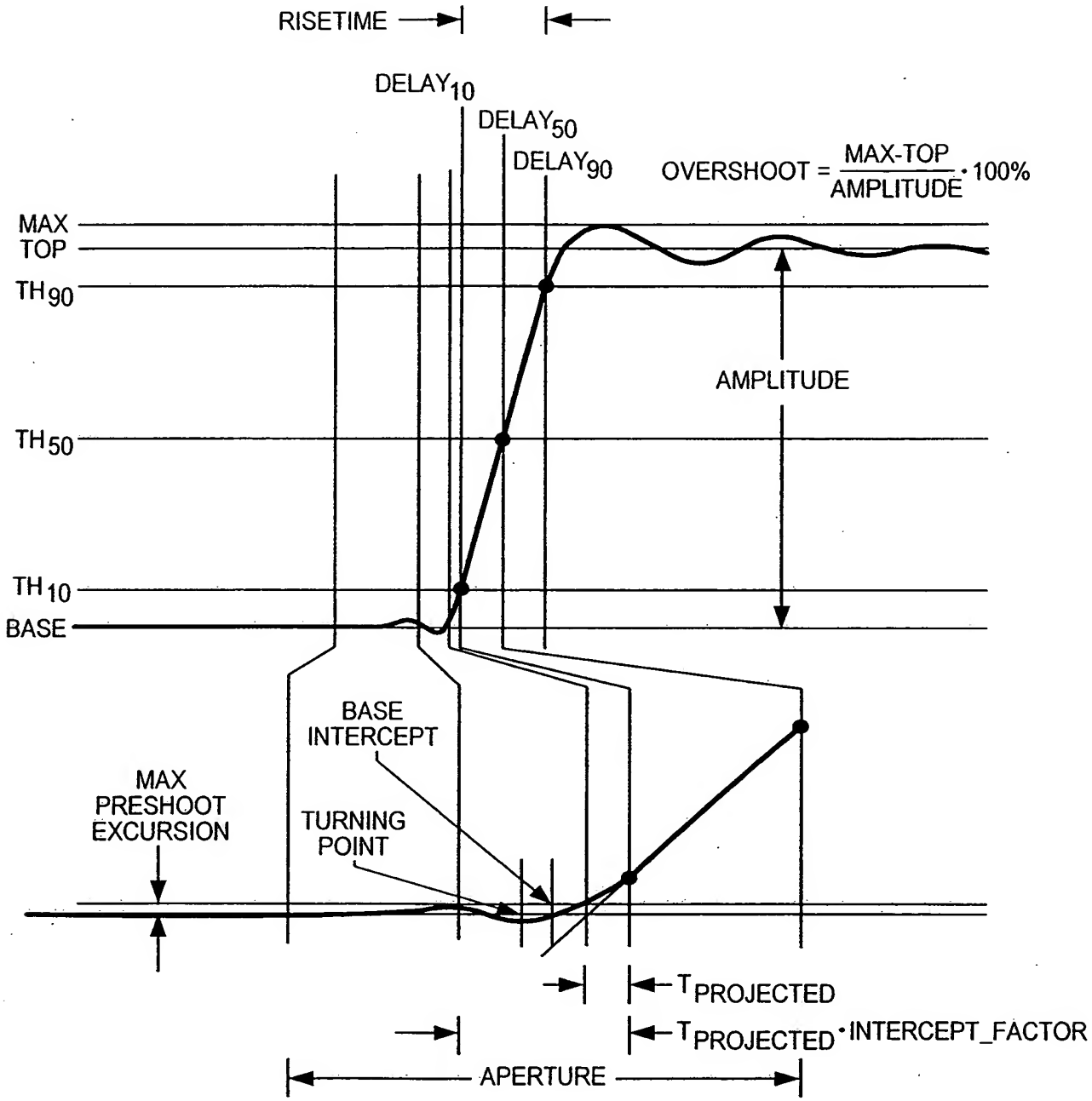

RISETIME
DELAY10
DELAY50
DELAY90
OVERSHOOT = MAX-TOP / AMPLITUDE · 100%
MAX
TOP
TH90
AMPLITUDE
TH50
TH10
BASE
BASE INTERCEPT
MAX PRESHOOT EXCURSION
TURNING POINT
TPROJECTED
TPROJECTED · INTERCEPT_FACTOR
APERTURE
PRESHOOT = MAX_PRESHOOT_EXCURSION / AMPLITUDE · 100%

FIG. 12

FIG. 13

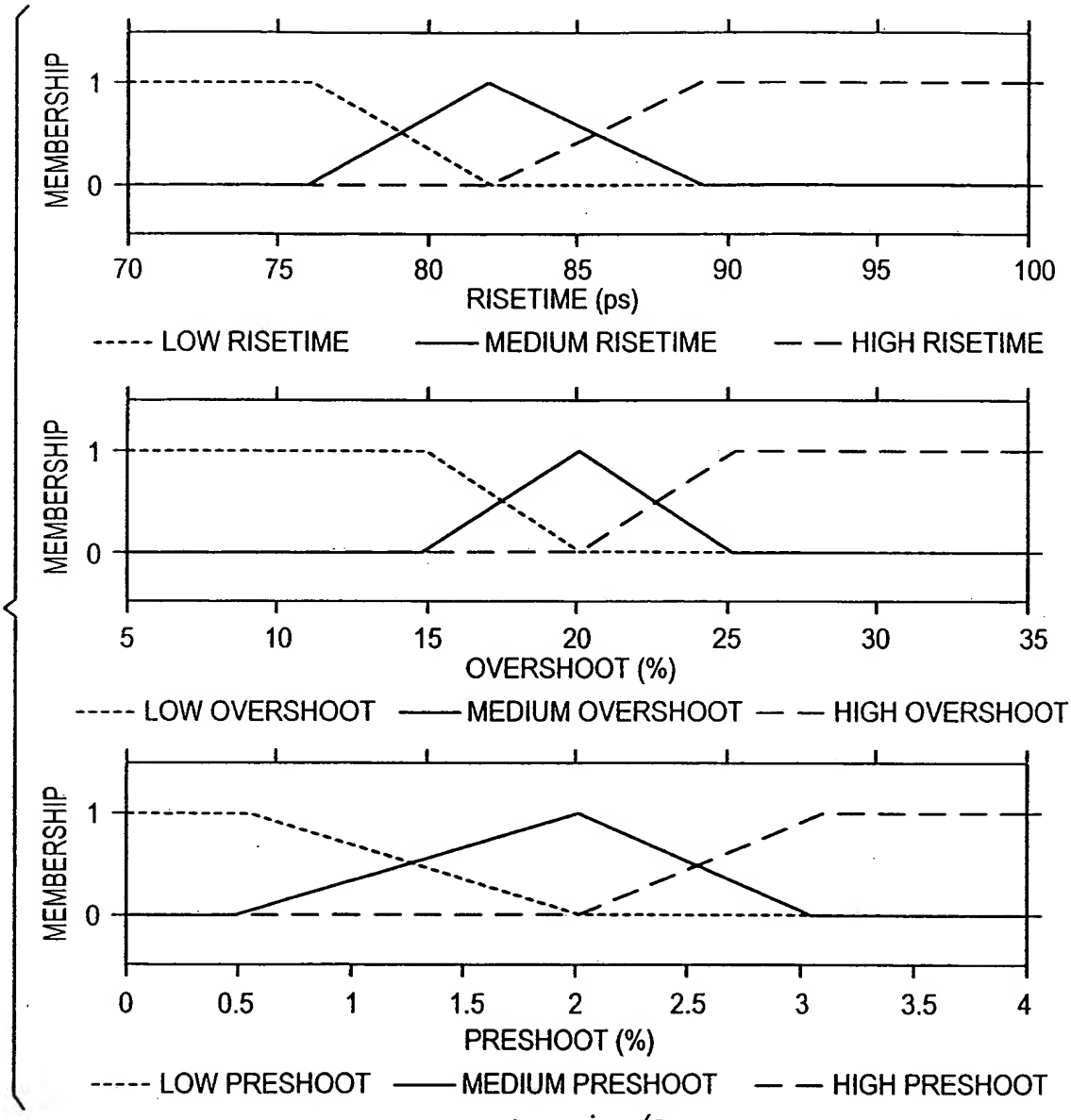
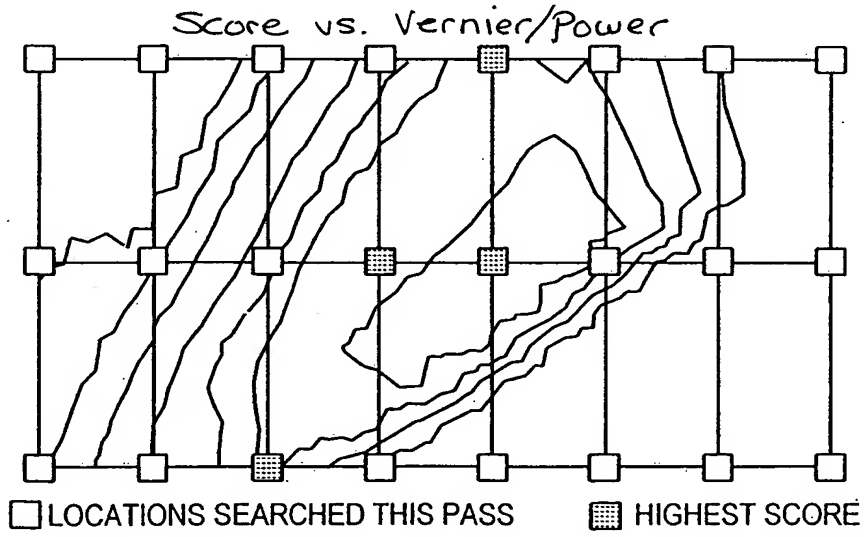

MEMBERSHIP
1
0
70
75
80
85
90
95
100
RISETIME (ps)
----- LOW RISETIME
—— MEDIUM RISETIME
— — HIGH RISETIME
MEMBERSHIP
1
0
5
10
15
20
25
30
35
OVERSHOOT (%)
----- LOW OVERSHOOT
—— MEDIUM OVERSHOOT
— — HIGH OVERSHOOT
MEMBERSHIP
1
0
0
0.5
1
1.5
2
2.5
3
3.5
4
PRESHOOT (%)
----- LOW PRESHOOT
—— MEDIUM PRESHOOT
— — HIGH PRESHOOT

FIG. 14


Score vs. Vernier/Power
LOCATIONS SEARCHED THIS PASS
HIGHEST SCORE

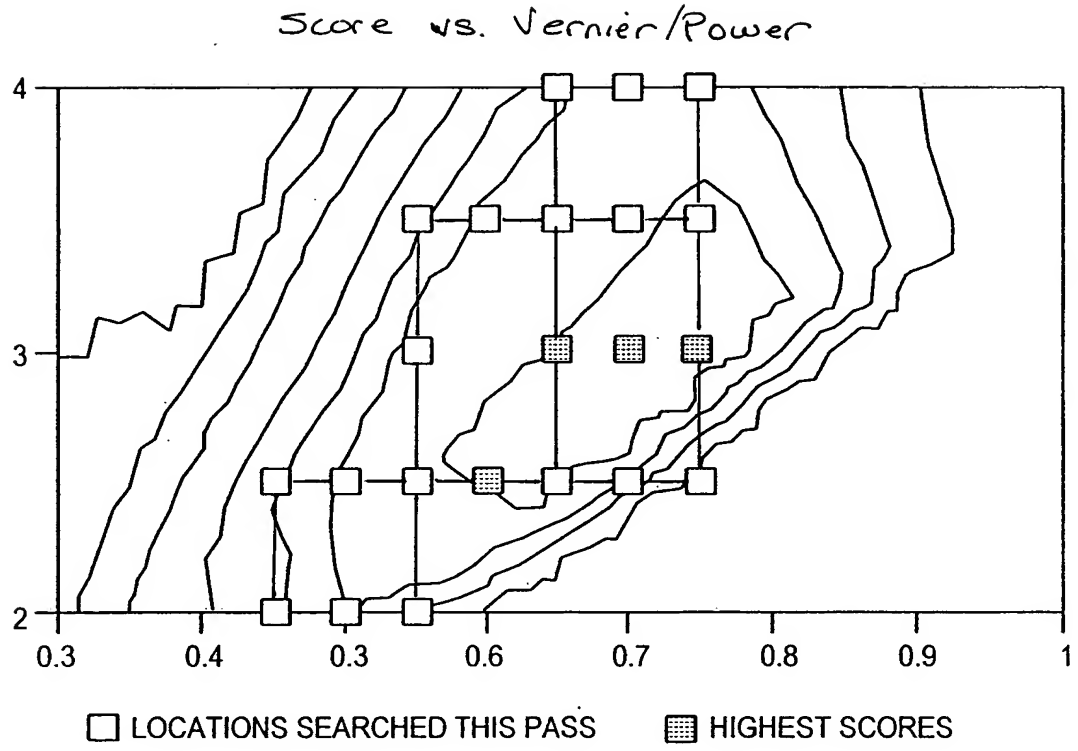

Score vs. Vernier/Power
4
3
2
0.3
0.4
0.3
0.6
0.7
0.8
0.9
1
LOCATIONS SEARCHED THIS PASS
HIGHEST SCORES

FIG. 15

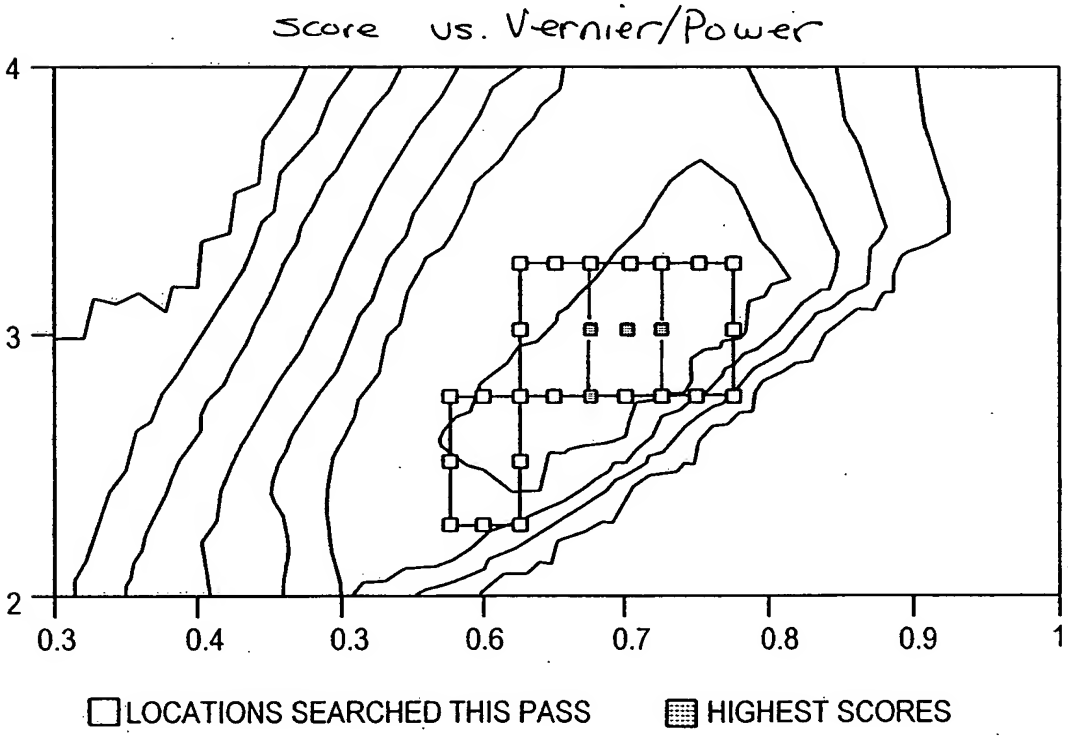

Score vs. Vernier/Power
4
3
2
0.3
0.4
0.3
0.6
0.7
0.8
0.9
1
LOCATIONS SEARCHED THIS PASS
HIGHEST SCORES

FIG. 16

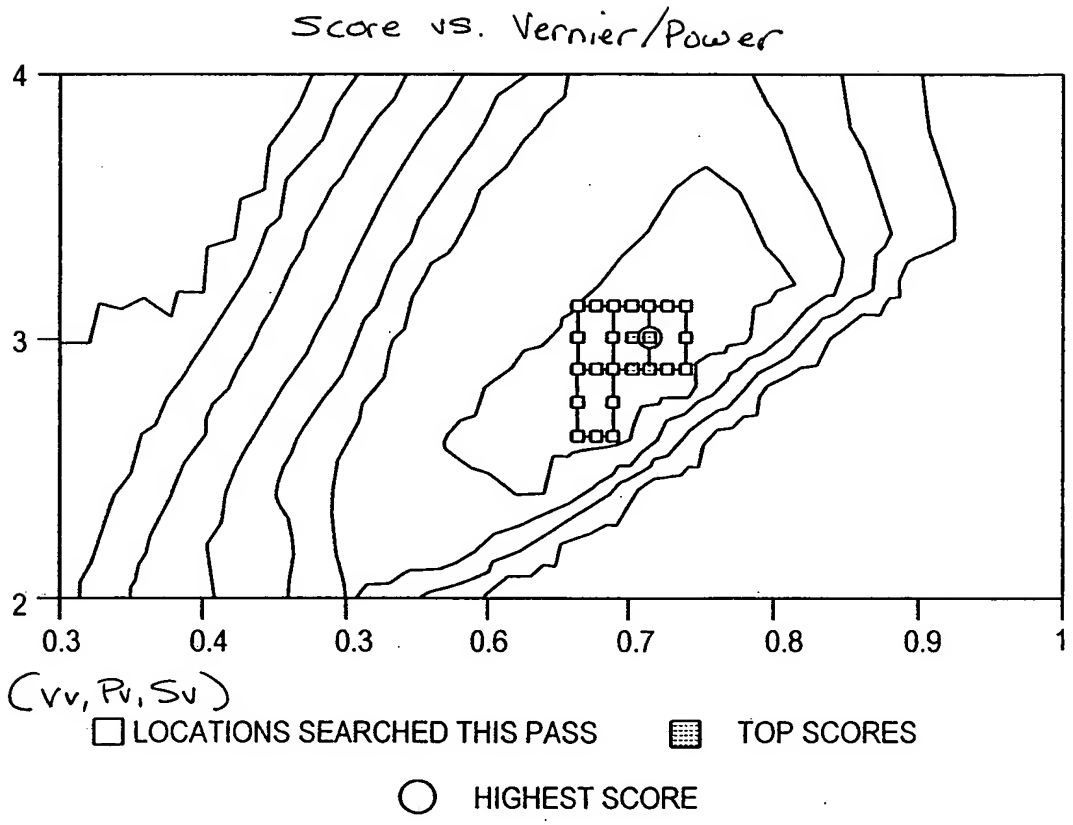

Score vs. Vernier/Power
4
3
2
0.3
0.4
0.3
0.6
0.7
0.8
0.9
1
(Vv, Pv, Sv)
LOCATIONS SEARCHED THIS PASS
TOP SCORES
HIGHEST SCORE

FIG. 17

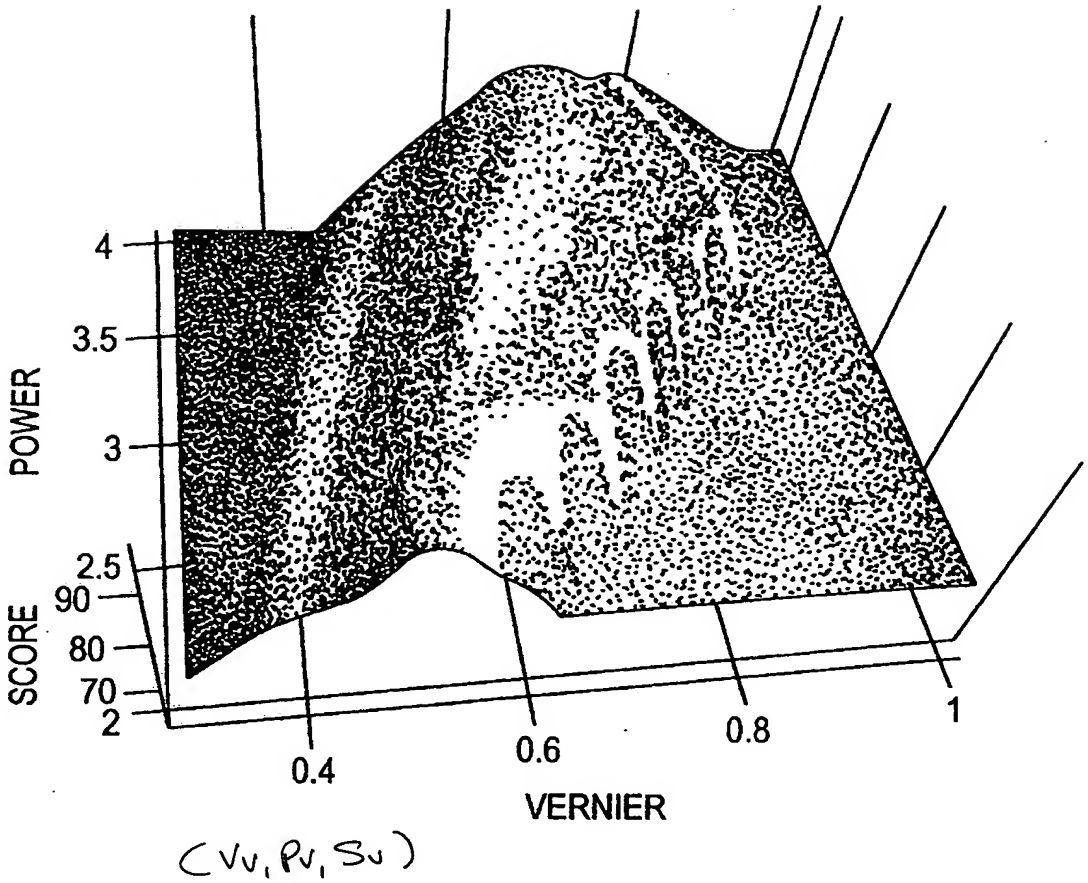


FIG. 18

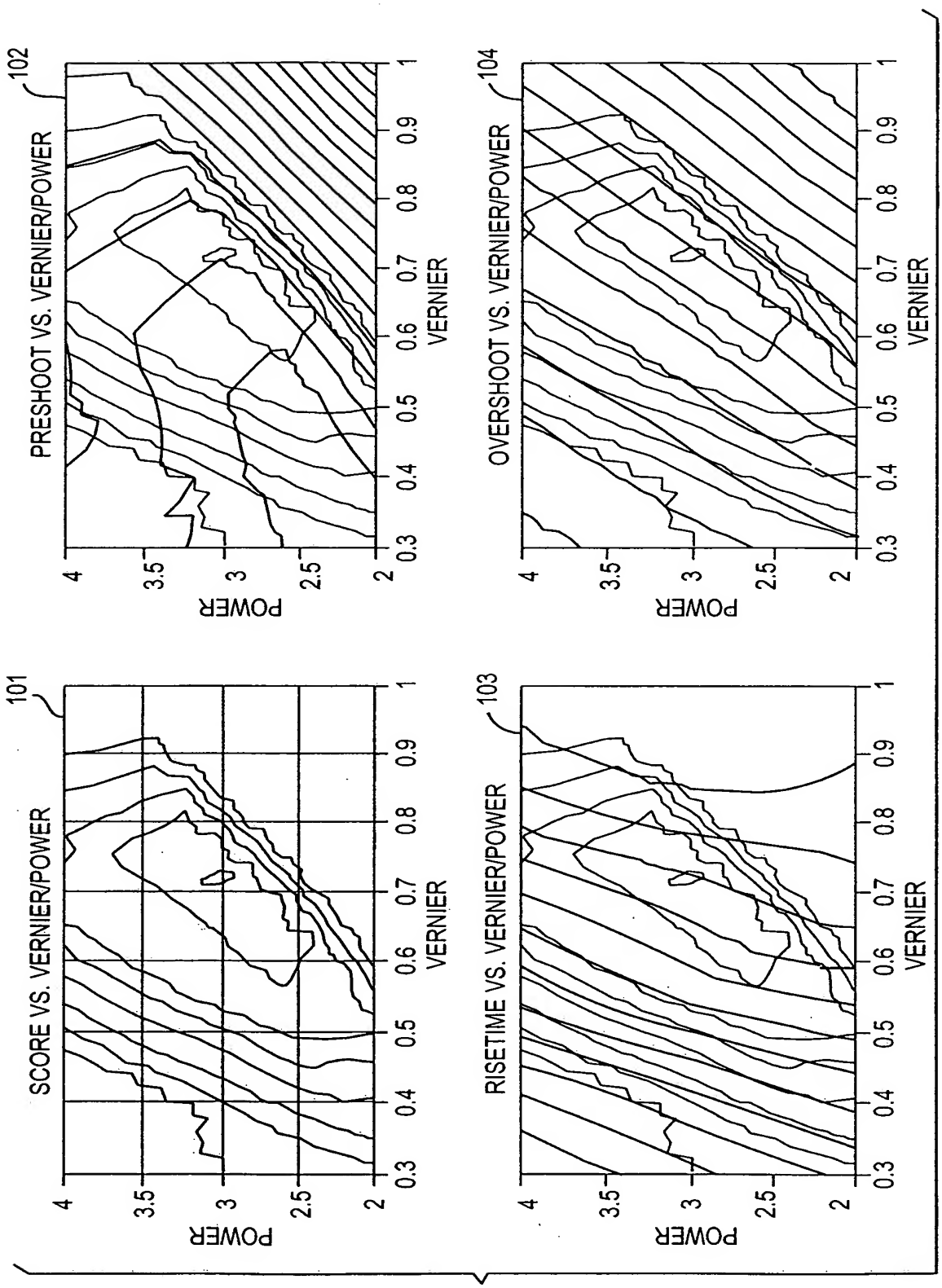

101
SCORE VS. VERNIER/POWER
102
PRESHOOT VS. VERNIER/POWER
103
RISETIME VS. VERNIER/POWER
104
OVERSHOOT VS. VERNIER/POWER
POWER
VERNIER
4
3.5
3
2.5
2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

FIG. 19

FIG. 20

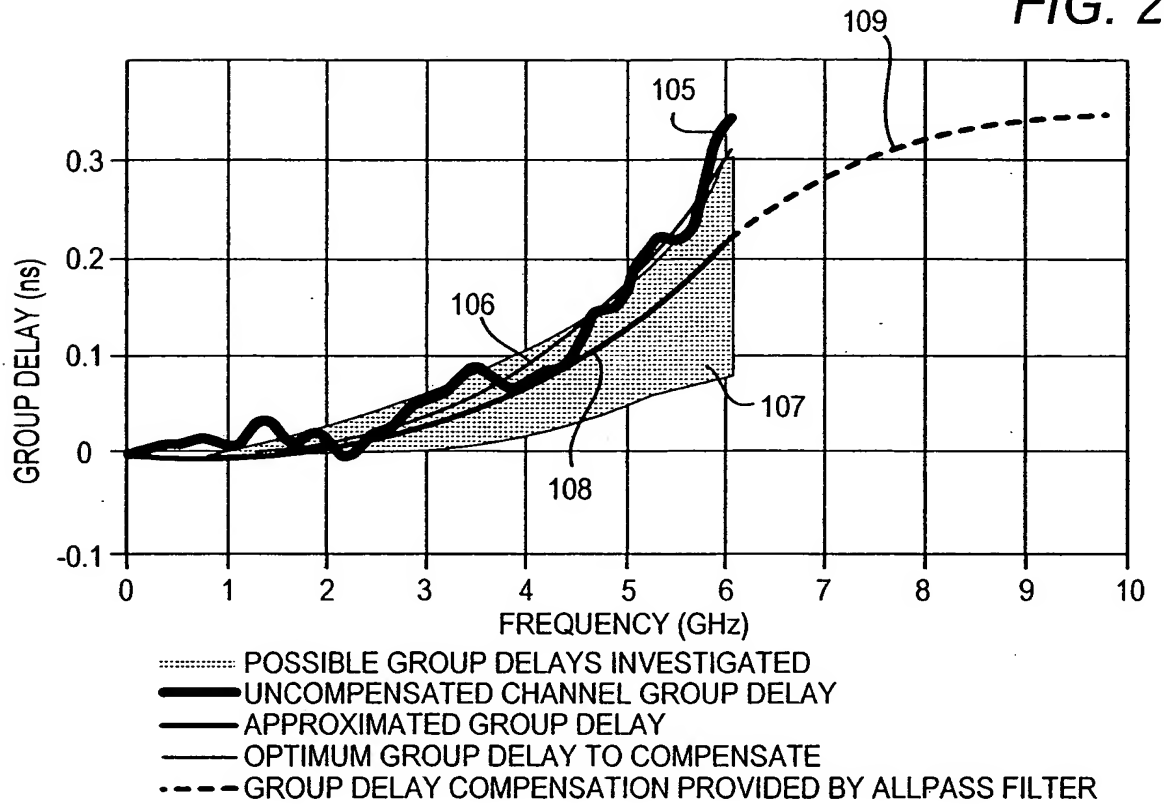
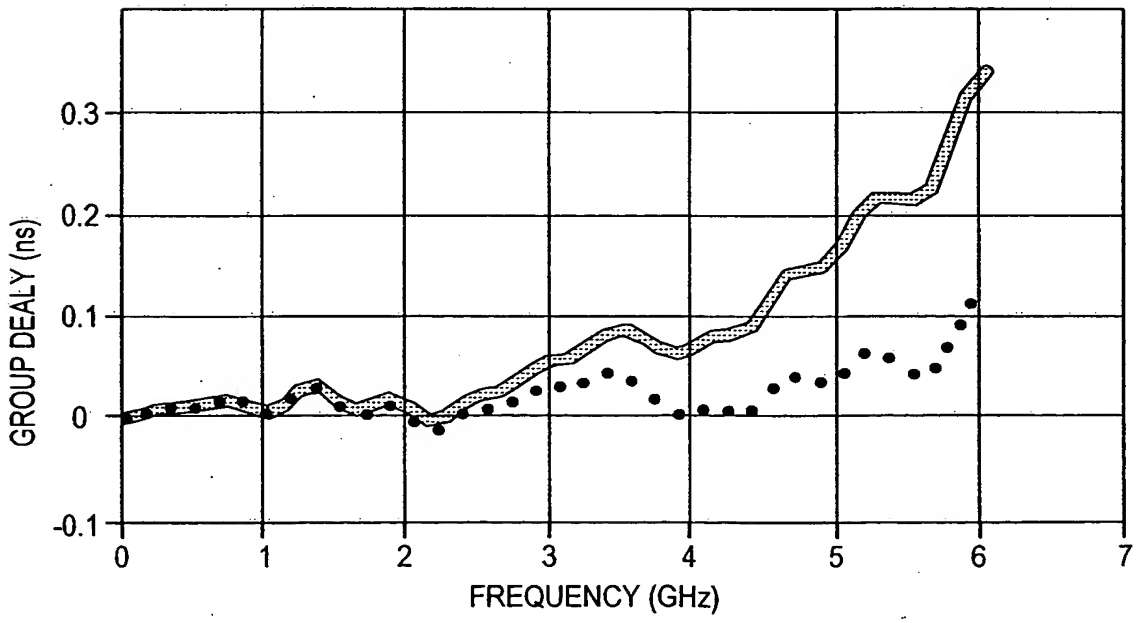

109
105
106
107
108
0.3
0.2
0.1
0
-0.1
GROUP DELAY (ns)
0
1
2
3
4
5
6
7
8
9
10
FREQUENCY (GHz)
POSSIBLE GROUP DELAYS INVESTIGATED
UNCOMPENSATED CHANNEL GROUP DELAY
APPROXIMATED GROUP DELAY
OPTIMUM GROUP DELAY TO COMPENSATE
GROUP DELAY COMPENSATION PROVIDED BY ALLPASS FILTER

FIG. 21


0.3
0.2
0.1
0
-0.1
GROUP DEALY (ns)
0
1
2
3
4
5
6
7
FREQUENCY (GHz)
UNCOMPENSATED GROUP DELAY CHARACTERISTIC
COMPENSATED GROUP DELAY CHARACTERISTIC